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# SNAP CRITICAL ASSEMBLY - 4A (SCA-4A)

## OPERATING LIMITS

| Basic Limits | Assurance Limits |
|---|---|
| **A. Reactor Parameters** | |
| 1. Maximum core curie inventory: $10^3$ curies | Maximum flux level of $10^{-6}$ amps on the picoammeter. For each operational fuel assembly the Engineer-in-Charge shall document the analysis which shows that a power level of not greater than 200 watts will result in a picoammeter reading of $10^{-6}$ amps. |
| 2. Maximum fuel temperature: 1400°F | Any operation above 150°F shall include temperature instrumentation on hottest fuel material or cladding. |
| 3. Maximum reactivity insertion rate: 2¢/sec. | Parameters affecting rate shall be checked annually and whenever calculations indicate that a new core configuration will result in a significant increase in the insertion rate. |
| 4. Maximum excess reactivity and minimum shutdown margin: The excess reactivity shall be limited so that it will not be possible to achieve criticality on movement of the safety elements alone. When shutdown the assembly shall be subcritical by the reactivity worth of the safety elements. | To be determined on each startup. The Engineer-in-Charge shall maintain a record of the reactivity status in his log. |
| 5. Prompt temperature coefficient: -0.04¢/°F at 68°F to -0.06¢/°F at 1000°F | The use of any fuel or material that will change the temperature coefficient shall be reviewed as per the requirements in NAA-SR-Memo-7422 (Rev. 1). |
| **B. Safety System Features:** | |
| 1. Minimum safety system instrumentation requirements: a. For startup and operation, Table 1 b. For fuel loading, Audible count rate monitor | Nuclear instrumentation tested quarterly. Nuclear scram settings and manual scram function tested prior to first startup of every operating day. |
| 2. Minimum number of scrammable safety elements: 2 | Scram action checked prior to each startup. Scram time checked semiannually. |

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| Basic Limits | Assurance Limits |
|---|---|
| 3. Interlocks for startup and operation: Listed in Sections II.D.1.a and b of NAA-SR-Memo-7011 | Functional performance checked monthly. Permission of Engineer-in-Charge required to effect a bypass. Each bypass use shall be documented by the Engineer-in-Charge in his log. |
| 4. Scram bypasses: None of the scram initiating circuits as listed in Table 1 may be bypassed | The Engineer-in-Charge shall not authorize any scram circuit bypasses. |
| 5. Radiation monitoring equipment: Table 2 | All monitors shall be tested quarterly. |
| C. Administrative Procedures: | |
| 1. Written operating and test procedures shall be used for all activities involving reactor operation, fuel handling, and emergency evacuation | All operating and test procedures shall be reviewed and approved in accordance with Figure 2 of NAA-SR-Memo-7422 (Rev. 1). |
| 2. Loading of different fuel, cladding or other materials into the assembly shall be such as not to change the magnitude of accidents analyzed in NAA-SR-Memo-7011 | All such tests shall be subject to the review and approval requirements set forth in C.1, above. |
| 3. Operating crew qualifications and staffing shall be in accord with pages 11 through 14 of NAA-SR-Memo-7422 (Rev. 1). | The responsible Group Leader shall maintain a current record of the staff and their operator status. |

TABLE 1

MINIMUM SAFETY SYSTEM INSTRUMENTATION REQUIREMENTS
FOR STARTUP AND CONTINUING OPERATION

| INSTRUMENT FUNCTION | NUMBER REQUIRED | SCRAM SET POINT |
|---|---|---|
| Log Count Rate Meter and Period | 1 | 10 sec |
| Log N and Period | 1 | 10 sec |
| Linear Picoammeter | 2 | 95% of full scale |
| Earthquake Switch | 1 | Modified Mercalli VII |
| Manual Scram Button | 1 | |
| Interlocks | All | |

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TABLE 2

CONTINUOUSLY OPERATING RADIATION MONITORING EQUIPMENT*

| LOCATION | ALARM SET POINT |
|---|---|
| Reactor Room | 100 mr/hr |
| Control Room | 10 mr/hr |
| Airborne Particulate Monitor | |

* In the event these instruments are inoperative or taken out of service they shall be either replaced with an equivalent instrument or periodic sampling shall be initiated.

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